transport, and would appear to be well adapted in every way for the purpose.

The enterprise, when fully developed, is estimated to cost 500,000*l.*, but, for obvious reasons, only a very limited development is possible at present. With the large acreage at its disposal, some of the difficulties which have beset earlier enterprises are obviously greatly reduced. The scheme also presents other features which inspire confidence in its ultimate success, and the progress of this important national experiment will be watched on all sides with the greatest interest.

C. C.

SIR A. R. BINNIE.

A GREAT engineer, Sir Alexander Richardson Binnie, born in London in 1839, died on May 18 at the age of seventy-eight. He joined the Institution of Civil Engineers in 1865, and in 1905 became its president. He was a member of the Institution of Mechanical Engineers, the Geological Society, and other societies, and contributed to their Transactions several valuable papers. Always interested in historical studies, he sketched in an address to the Institution of Civil Engineers the progress of science and engineering during the eighteenth and nineteenth centuries.

Sir Alexander served a pupilage to Mr. T. W. Flanagan and John F. La Trobe Bateman, and was at first engaged on railway construction in Wales. After a short period of practice in London he went in 1868 to India, and as executive engineer in the Department of Public Works was engaged in coal exploration, on railways, and in carrying out schemes of water-supply. His most important work in India was the construction of a reservoir for the supply of the city of Nagpur. In 1875, when in England on furlough, he was consulted by the Bradford Corporation with regard to difficulties which had arisen in the water-supply of that city. He became the water engineer of Bradford, a position he retained for fifteen years. From 1890 to 1901 he was the chief engineer to the London County Council, and greatly assisted in the reforming activities of that time. He completed the sewage works at Barking and Crossness, and directed the construction of the Blackwall Tunnel, the Barking Road Bridge, and the Highgate Archway. In 1897 he was knighted. During this period he studied a scheme for the supply of water to London from North Wales. He surveyed a watershed in the valleys of the Wye and Usk capable of discharging 415 million gallons daily after allowing for losses. The water was to be brought to London by two conduits, 150 to 170 miles in length. The scheme was very carefully worked out, but its cost was deemed prohibitive, and London was content with a supply from less pure sources nearer at hand.

When in India Sir Alexander investigated questions of rainfall, evaporation, and flow off the ground, as to which for tropical countries there was not much information at that time. He was specially interested in tracing a connection between sun-spot periods and the fluctuations of rainfall.

Sir Alexander had great kindliness and courtesy and was greatly respected by all who knew him. He was an excellent witness before Parliamentary Committees and in the law courts, where his great knowledge, clear statement of his case, and obvious honesty gave weight to his evidence.

NOTES.

THE memory of the late Prof. Raphael Meldola is cherished with affection by workers in many scientific fields. It is to be hoped that a worthy memorial will eventually be established as a national tribute to his work and influence, but it is thought that the present is not an appropriate time for a public appeal with this object in view. Moved, however, by a desire to preserve a permanent impression of his features, some of Meldola's friends are arranging to present his portrait to the Royal Society and to the Institute of Chemistry, and subscriptions varying from half a guinea to ten pounds have already been contributed by those who have heard of this intention. There are doubtless others who will welcome the opportunity of taking part in this modest expression of esteem, for Meldola was known to students of widely different branches of science, and it is feared that some of them may have been overlooked when the invitation to subscribe to the memorial was sent out. We are glad to assist in repairing any such inadvertent omission by directing attention to the Meldola Portrait Fund, for which an account has been opened at Messrs. Barclay and Co.'s Bank, Oxford, Banbury Road Branch. In these columns it is unnecessary to dwell upon Meldola's scientific achievements, the breadth of his intellectual sympathy, or the patriotic zeal with which he wore himself out in his country's service—his friends knew these qualities fully, and it is they who wish to show appreciation of them by the presentation of his portrait to the two societies mentioned, both of which will gladly welcome this memorial of him. Mr. Solomon J. Solomon, R.A., has consented to paint the portraits, and has entered into the scheme in a most generous spirit. Contributions for the fund should be sent to Prof. E. B. Poulton, Wykeham House, Oxford.

DR. JØRGEN BRUNCHORST, Norwegian Minister in Rome, who died in that city on May 20, was in his early days a botanist. Born at Bergen on August 10, 1862, he was assistant to the professor of botany at Tübingen, and took the degree of Ph.D. at Heidelberg in 1885. He studied chiefly the physiology and diseases of roots, and published several papers on those subjects from 1884 to 1888. Appointed conservator of Bergen Museum in 1886, he soon took part in communal life by publishing a practical book on the diseases of the economic plants of Norway (1887). The age of D. C. Danielssen threw much administrative work on Brunchorst, who was first the museum's secretary, and succeeded to the post of director in 1901. It was he who took the lead in all public lectures to students and to the public, the editing of the popular periodical *Naturen*, the planning of the Botanic Garden, and the establishment of the Biological Station. Further than this, he strongly supported co-operation with the other northern nations and with this country in the fisheries investigation of the North Sea. He was delegate to the Fishery Congress at Dieppe, and to the second conference on the International Catalogue of Scientific Literature held in London in 1898. Virile and straightforward in manner, of keen intelligence and wide sympathies, Brunchorst will be much regretted by those friends in this country from whom he has been taken at an age so unexpectedly early.

ENGINEER REAR-ADMIRAL G. G. GOODWIN, C.B., has been appointed Engineer-in-Chief of H.M. Fleet, with the rank of Engineer Vice-Admiral, in succession to Engineer Vice-Admiral Sir Henry J. Oram, K.C.B., F.R.S.

DR. C. D. WALCOTT, secretary of the Smithsonian Institution, has been elected president of the U.S. National Academy of Sciences, in succession to Prof. W. H. Welch, of the Johns Hopkins University; and Dr. A. A. Michelson, of the University of Chicago, has been elected to succeed him as secretary of the academy.

THE annual meeting of the Institution of Gas Engineers is to be held on Tuesday, June 5, at the Institution of Civil Engineers, when reports will be presented of the research committees on, respectively, Refractory Materials, Gas Lighting, Heating and Ventilation, and Life of Gas Meters. Lord Moulton, F.R.S., has been nominated for election as president of the institution for the year 1917–18.

AT the monthly general meeting of the Zoological Society of London, held on May 16, his Grace the Duke of Bedford in the chair, it was announced that, in comparison with the corresponding period in 1916, there was a decrease in the number of visitors of 75,353, and a decrease in the receipts of 1756*l.* The additions to the society's collections during the month amounted to 130, of which special mention may be made of a female chimpanzee from West Africa, two pandas (*Aelurus fulgens*) from Nepal, and a Demidoff's galago (*Hemigalago demidoffi*) from Ashanti.

WHILE we are glad to know that it has been decided to establish a National War Museum, we are not a little alarmed at the many impracticable and sometimes fatuous suggestions as to the nature of the objects which should find a place there. We do not, for example, consider that ornaments made of chewed bread, even though they were made by prisoners of war in internment camps, are worthy of a permanent place in such a collection. As well might we add a lump of mud from the wheel of a limber in Flanders! The writer of a long article on this theme in the *Museums Journal* for May expresses a hope that the Tower of London may be used as the repository of this collection, and there are even people who seem to agree with him. But if a tithe of the things he proposes to admit are collected, an annexe several times the size of the Tower will have to be provided. By all means let us have this museum, but let a little judgment be exercised in its formation.

IT is announced from New York by the Exchange Telegraph Co. that the members of the Crocker Land Expedition are safe at Etah. The expedition sailed for the Arctic in July, 1913, under the auspices of the American Museum of Natural History of New York, to explore the land supposed to lie north-west of the line of islands stretching from Grant Land to Prince Patrick Land. Two years later, however, Mr. Donald B. Macmillan, the leader, sent a message which, after recording several misadventures which the expedition had encountered, announced that Crocker Land did not exist. He and his companions have since remained in the Arctic, mapping uncharted coast lines and carrying on other scientific work.

THE fifteenth annual session of the South African Association for the Advancement of Science will be held at Stellenbosch, from Monday, July 2, to Saturday, July 7, inclusive, under the presidency of Prof. J. Orr. The sectional committees and their presidents will be as follows:—A: Astronomy, Mathematics, Physics, Meteorology, Geodesy, Surveying, Engineering, Architecture, and Irrigation, Prof. W. N. Roseveare; B: Chemistry, Geology, Metallurgy, Mineralogy, and Geography, Prof. M. M. Rindl; C: Bacteriology, Botany, Zoology, Agriculture, Forestry, Physiology, Hygiene, and Sanitary Science, J. Burtt-Davy; D: Education, History, Mental Science, Political Economy, General Sociology, and Statistics, Rev. Prof. N. J. Brümmer; E: Anthropology, Ethnology, Native Education, Philology, and Native Sociology, Rev. N. Roberts. The local secretary is Prof. B. van der Riet, Victoria College, Stellenbosch.

THERE lately passed away a notable public servant in the person of Mr. Alexander Gibson, late Senior Chief Cartographer at the Admiralty. The public hears much of some of its prominent officials, but is unaware of the existence of many highly technical services that are silently rendered to the State, without public recognition, and sometimes without much official encouragement. Mr. Gibson was, however, well known in that circle of scientific interests concerned with geographical and cartographical work, and had been a distinguished occupant of the official position referred to, from which he retired in 1914, after forty years' service at the Admiralty. When the war commenced he was recalled to continue his services, and was at work until a few days before his death. Mr Gibson's long and continuous service at the Admiralty had made him an unequalled authority upon the charts of the coasts and waters of the world, both British and foreign, and with his great capabilities for critical examination and research he contributed many important records of high value to the work of accurate chart construction.

DR. GEORGE SARTON will be known to many readers of NATURE as the editor of the excellent quarterly, *Isis*, which was published near Ghent until the war stopped publication. Dr. Sarton is at present lecturing at Harvard University, and is continuing with his usual vigour his important work in organising the history and use of science in civilisation. In *Science* for March 23 last he published a very interesting proposal for an American Institute for the history of science and civilisation, which appeals "to those interested in placing before American students advantages not only greater than are now offered in this country (America), but greater than those offered abroad." "Science," says Dr. Sarton, "is the strongest force that makes for the unity of our civilisation, and it is also essentially a cumulative process, and hence no history of civilisation can be tolerably true and complete in which the development of science is not given a considerable place." Particularly interesting among the activities of the proposed institute is that of publishing two journals, one of a popular nature, and the other of the highest scientific character. The scientific journal might be a series of editions of important scientific manuscripts, or a journal of the type of *Isis*, which should record the world's work on the subject. It may be added that perhaps this scheme might fit in with the admirable suggestion made by Prof. Rignano in NATURE of January 25 last of a quadruple scientific "Entente." Now America has jointed the Entente, our scientific future is certainly rosier. Dr. Sarton's note concludes with an imposing list of American men of science who are in sympathy with his project.

AT the May meeting of the Society of Glass Technology Prof. Herbert Jackson gave a short account of the valuable work accomplished in glass research since 1914 at the instigation of the Institute of Chemistry and the Ministry of Munitions. One outcome of this work has been the placing of at least fifty new batch formulæ at the disposal of glass manufacturers, to experiment with, to adopt, and to improve. Amongst the most important formulæ available may be mentioned batches for resistant and ordinary chemical ware; soft glass for lamp work; combustion tubing; various types of glasses for X-ray work; opal glasses; thermometer glasses; and optical glasses. To show the widespread nature of the researches already carried out upon glass, he said, the effect of almost every known element has been tried, and many glasses with interesting properties are now available both for present and post-war use. By fostering research in many directions and by the admission of science in its most advanced form into their industry glass manufacturers have ensured the progress of the industry in the future. The enthusiasm of the manufacturer is reflected in the founding of the Society of Glass Technology, and the interests of the whole glass industry are being well served by the glass technology department of the University of Sheffield, and by the numerous representative committees set up by the Ministry of Munitions. The glass industry, in fact, is a striking example of the co-ordination of the manufacturer and man of science at its best. The next meeting of the Society of Glass Technology will be in June, at the University of Sheffield, when a joint discussion on refractory materials has been arranged with the Faraday Society.

In the May issue of *Man* Mr. E. W. P. Chinnery describes the use among the coast tribes of Papua of the conch shell and wooden trumpet as a mode of signalling. This is usually performed by males, but women sometimes use these instruments, and in the Kikori River delta women beat a kind of tattoo with sticks on the sides of their canoes to announce the killing of men and pigs, while the males sound calls on the conch shell. This account is supplemented by a note contributed by Dr. A. C. Haddon, with a good bibliography, in which he describes the distribution of similar wooden trumpets in Netherlands New Guinea and on the Sepik River.

In the Transactions of the Glasgow Archæological Society, N.S. (vol. vii., part i.), Sir P. I. Hamilton Grierson discusses the question of fosterage, not as a chronicle of phenomena, but as a process of evolution. By fosterage he means the rearing of a child, undertaken at the request of its parents by someone who is neither its father nor its mother, for a limited time, with the result that a bond is created between the foster-child and its foster-parent and foster-brethren, and, in many instances at any rate, between the natural father and the foster-father. Dealing with the question in detail from this point of view, he arrives at the conclusion that if we would make fosterage yield the secret of its origin, we must study it in connection with other forms of artificial relationship—the milk-bond, the bond of the blood-brothers, the bond of adoption, the bond of gossiprede, and the bond existing between teacher and scholar; and such a study will be found to illuminate not only the questions involved in this inquiry, but other vexed problems of early family relationships.

In a pamphlet published for the Polish Information Committee, Mr. W. Nalkowski has endeavoured to show what the natural features of Poland are which give it its individuality ("Poland as a Geographical Entity." London: Geo. Allen and Unwin, Ltd., 6*d.* net). Despite considerable compression and a rather ponderous style, the author has succeeded in giving a very able and useful survey of the characteristics of Polish geography, and has proved his contention that the outstanding feature is the "transitionality" of Poland. It is a country in which western and eastern Europe mingle, and the reciprocal action of these influences gives a colour to its life. Whether or not that characteristic is one which fits Poland to stand as a separate nation might be open to argument. Mr. Nalkowski foresees this criticism, which he answers by pointing out that original Poland has clear frontiers to north and south, and in the basin of the Vistula has a nucleus around which the country centres. The latter contention, to a certain extent, is true, but the transitionality of Poland results not from her northern and southern frontiers, but from her eastern and western ones, which the author admits are weak. These indefensible frontiers have subjected Poland to heavy blows and ceaseless struggles in the past. The future of a regenerated Poland will show whether open frontiers favouring human intercourse stand a country in better stead than physical barriers crossed with difficulty. The pamphlet is a useful contribution of geography to a problem in world-politics and throws much light on the subject.

The annual report for 1915 of the Technological Museums, Sydney, New South Wales, well indicates the way in which our Colonies are using the collections in their great museums. We learn, for example, that "it is clear to most people now that the prosperity and safety of the Empire will in a large measure depend upon the manner in which scientific research and discovery are encouraged in the future. If we are to succeed, no initial outlay should be spared, as it does not take long, once a discovery has been made into a going concern, for the initial outlay to be easily covered. This is well illustrated in one of the museum researches alone—*i.e.* on the pines of Australia—as the commercial advantages to the State will more than repay a hundredfold the cost of the whole of the researches carried out here. Consequently, I view with great interest the proposal of the Prime Minister to establish a Bureau of Scientific Research—a scheme which, if carried out on proper lines, will no doubt result in an effective achievement worthy of Australia." The present report deals with the technological work of the Technical Education Branch of the Department of Public Instruction, and the document is illustrated by reproductions of photographs of the "Australian Essential Oil Cases" and the "Museum Essential Oil Still." Mr. R. T. Baker is the curator.

The life-history of bacteria is dealt with by Mr. Edward Hort in a paper in the *British Medical Journal* (May 5, p. 571). The current view is that bacteria reproduce by simple binary fission and occasionally also by endospore formation. Mr. Hort maintains that a relatively complicated life-cycle takes place in the enteric group of bacilli which he has studied. Superficial, median, and terminal minute buds are formed by gemmation from the parent, and these buds may undergo segmentation. The buds vary in size from about 0·1 μ to several μ, and the smallest forms may be filterable. Some of the aberrant forms in cultures may be mutations or developmental stages, and not involution forms as they are usually regarded. In order to demonstrate the various stages a somewhat acid broth was used as culture medium, and the films were treated by Benian's Congo-red absorption method for microscopical examination.

Mr. N. L. Bowen adds an important paper to his previous study of nepheline, and has prepared the potassium representative of this mineral artificially (*Amer. Journ. Science*, vol. xliii., p. 115, 1917). This artificial kaliophilite is occasionally accompanied by leucite. An orthorhombic form of $KAlSiO_4$ has also arisen during the experiments. Readers of this paper may like to note Dr. A. Scott's references to artificial nepheline and carnegieite prepared by him (Trans. Geol. Soc. Glasgow, vol. xvi., p. 41, 1916).

MR. E. T. WHERRY (*American Mineralogist*, vol. i., p. 37, 1916) shows that crystals of glauberite, $Na_2Ca(SO_4)_2$, were deposited during the drying of fluviatile beds of Triassic age in eastern Pennsylvania in place of those of rock-salt that are familiar in many areas. The author attributes this occurrence to the composition of the local waters; it seems possible that glauberite, which has a low solubility, represents a stage antecedent to that of the deposition of gypsum, and that the continued trickle of waters seaward carried off the sodium chloride and many other salts.

A PROCESS is described in the *Scientific American* for April 21 for coating the end portions of wooden propeller blades for aeroplanes, etc., with a thin layer of copper, by which they are strengthened, given a better cutting edge and surface, and protected from brush, etc., on landing. The details of the process are interesting. First, the wood is rendered impervious by saturating with a wax varnish, which is then coated with a thick linseed-oil varnish. Then a shellac varnish is applied and allowed to dry. A thin deposit of silver sulphide is produced by treatment with a silver nitrate solution made with alcohol and water, the surface being then exposed to sulphuretted hydrogen gas. Copper is electrolytically deposited on this film.

THE Ordnance Survey has published, at the price of 3*s*., a geological map of Dublin on the scale of 6 in. to 1 mile. The topographic basis is identical with sheet 18 of the Ordnance Survey map of the county of Dublin. The map embraces the city, Phœnix Park, and a large outlying residential district. The superficial deposits, boulder clay, glacial gravels, river gravels, alluvium, and materials on the area in-taken from the sea, together with the few patches of underlying limestone rock which rise to the surface, are indicated by separate colours. The alterations, due partly to human, partly to marine agency, in the coastline at the west end of Dublin Bay are well shown by the insertion, in red dotted lines, of the coast as represented in a map by Bernard de Gomme, published in 1673. We believe this is the first urban district for which a cheap colour-printed map has been published on the six-inch scale. This excellent example might well be followed in the case of each of our larger town areas. Such maps, particularly if they were accompanied by a short, clear, explanatory pamphlet, would be invaluable for educational purposes, and copies should be hung in every urban school. They would also be of very great use to architects, surveyors, and engineers, and to all who are concerned with house-sites or town planning.

AN effort is being made by the American National Advisory Committee for Aeronautics to promote the study of the atmosphere over the United States and the adjacent seas, and have a set of accurate charts made for the benefit of aviators. We wish the committee every success in the endeavour, but there is a proverb "as uncertain as the wind," and it is difficult to see how so uncertain an element as the wind can be charted at all, much less "accurately charted." No doubt the Weather Bureau has a large amount of information as to the strength and direction of the prevailing winds, and in America, as in Europe, the wind at a few thousand feet height will in general agree more or less with the isobaric charts, but a knowledge of the prevailing wind will not much increase the safety of an aviator who has to fly at a definite time and place. It is a correct and definite forecast rather than a chart that he requires, and it has been, as a matter of course, the chief object of the U.S. Weather Bureau to be able to give such forecasts for many years past. Extending the forecast to some 5000 ft. altitude is a comparatively easy matter when the surface conditions can be accurately foretold.

SOME interesting results of a spectroscopic investigation of sources of ultra-violet radiation for therapeutic purposes are given by C. A. Schunck in the Journal of the Röntgen Society for April. Among the sources examined were electrodes of pure metallic tungsten, molybdenum, and iron; carbon rods impregnated by boiling in solutions of sodium tungstate, uranium nitrate, and ammonium molybdenate; cored carbons filled with uranium oxide or wolfram; and the Simpson electrodes, which are said to consist of wolfram. The most intense source of ultra-violet radiations was found to be the electric arc with metallic tungsten electrodes, the spectrum being so full of lines as to be almost continuous to the limit of the spectrograph employed, at λ 2130. The Simpson arc gives a very similar spectrum, but the unsteadiness of this source is a disadvantage. The impregnated carbons give much more intense radiation in the spark than in the arc, a mixture of uranium nitrate and ammonium molybdate being the richest in ultra-violet radiations of any spark source. Observations of the effects of the various sources appear to show that the radiations of greatest therapeutic value lie between λ 3000 and λ 1850, and further spectroscopic observations to ascertain which part of this region has the greatest efficiency are in progress. The paper is illustrated by an excellent series of photographs of spectra.

IN part 5 of vol. v. of the Science Reports of the University of Sendai, Japan, Prof. K. Honda and Mr. J. Ôkubo apply the theory of ferro- and para-magnetism, published three years ago by Prof. Honda, to the effect of temperature on the magnetism of ferro-magnetic substances, and find a close agreement between their deductions from the theory and the experimental facts. According to Prof. Honda's theory, the molecules of a ferro-magnetic substance are nearly spherical, and the impacts of the molecules on each other due to their thermal motions have only a small effect in rotating the molecules, while the effect of their mutual magnetic action on each other is considerable. The molecule of a para-magnetic substance has, on the contrary, a more or less elongated form, and thermal motions have in consequence a great effect on the molecular rotations. The effect of the rotations in the case of the ferro-magnetic material is worked out in detail for weak external fields in the present paper, and it is shown that the magnetisation will diminish as the rotation increases, at first slowly, then faster, and that at a given angle the magnetisation will disappear. The effect of temperature on the permeability of ferro-magnetic substances is also investigated, and the curves connecting permeability with the angle of rotation are shown to be of the type found by Hopkinson for the relation between permeability and temperature in weak fields.

IN the Bulletin of the Société d'Encouragement pour l'Industrie Nationale for March–April M. Paul Janet gives some interesting details of the foundation and activities of the Laboratoire Central d'Electricité at Paris, which is administered by the Société Internationale des Electriciens under an arrangement with the State. The work of the institution is divided broadly into (1) tests and standardisation work for the public, (2) researches. The tests, etc., cover the checking of all kinds of electrical instruments. Among these may be mentioned the tests undertaken for the Marine Ministry on new types of storage battery for use in submarines, and standard tests on electric lamps used in the Navy. Investigations have been made for the War Ministry on meters, etc., used in gunpowder factories, also check tests on standard meters used by the Army in its own specification tests. The laboratory undertakes for the Ministry of Public Instruction and Fine Arts the verification of lightning arrester installations on public buildings. On the research side may be mentioned the important researches published by M. Ch. David on the various grades of carbons used for dynamo brushes; M. Jouaust's researches on the magnetic properties of iron, its magnetic viscosity, and its permeability at high frequencies; and MM. Laporte and de la Gorce's researches on the dielectric strength of insulating materials under continuous and alternating tensions and at varying frequencies. In 1914 the laboratory had in hand researches (which will be continued) on the Violle platinum light standard. MM. Broca and Laporte have undertaken experiments on the action on the human eye of various artificial sources of light, while Dr. Weiss and M. David have studied the mechanism of death from high-tension alternating currents. The Laboratoire Central represented France at the international experimental work carried out at Washington in 1910, as the result of the International Conference on Electrical Units and Standards held in London in 1908, and has published papers on the subject.

MR. A. CHASTON CHAPMAN's lecture on "Some Main Lines of Advance in the Domain of Modern Analytical Chemistry," delivered before the Chemical Society in March, has been reproduced in the Journal (vol. iii., pp. 203–20). Attention is directed to the increasing use of physico-chemical methods, the spectroscope and polarimeter being now supplemented by the refractometer, the electrometer, and a wide range of electrochemical apparatus. In the same way the use of derivatives of hydrazine as qualitative and quantitative reagents in organic chemistry has been extended by using phloroglucinol to precipitate furfural in estimating pentoses and pentosans, of digitonin to estimate cholesterol, and of picric and picrolonic acids in identifying such bases as arginine, histidine, lysine, and guanidine Organic compounds have also been introduced as reagents in inorganic chemistry, notably in the colorimetric estimation of nitrates and nitrites. Actual precipitation occurs, however, when benzidine hydrochloride is used to precipitate sulphates, or "nitron" to precipitate nitrates, the latter reagent furnishing for the first time a method for the gravimetric estimation of nitric acid. The separation of nickel from cobalt by means of dimethylglyoxime is characteristic of a considerable group of separations which can now be effected with remarkable ease and efficiency by making use of complex organic compounds. Biological processes, such as the selective fermentation of sugars by different species of yeasts, and the use of the "precipitin" reaction to distinguish between albumins from different sources, have also proved of great value in the analysis of foodstuffs. In conclusion, the lecturer urges the desirability of providing in this country professorships of analytical chemistry, similar to those which exist already on the Continent and in America.

MESSRS. J. WHELDON AND CO., 38 Great Queen Street, W.C.2, have just issued a catalogue (New Series, No. 79, "Books and Papers on Microscopical Science in all its Branches") which should be of interest to many of our readers. It is conveniently arranged under the headings:—Bacteriology, Parasitology, etc., Diatoms, Entomostraca, Foraminifera, Fresh-water Algæ and Desmids, Infusoria, Micro-Entomology, Micro-Fungi, Petrography, Crystallography, etc., Protozoa, Rotifera, Zoophytes, Biology, Histology, Physiology, and General Works on the Microscope. Many of the works catalogued, being published in enemy countries, are difficult to obtain at the present time. The list is to be had upon written application.

THE following works are in preparation for appearance in the "Cambridge Public Health Series" (*Cambridge University Press*):—"Ticks as Carriers of Disease," Prof. G. H. F. Nuttall; "Serum Diagnoses," Dr. C. Browning; "The Purification of Water in Sedimentation, Filtration, and Precipitation," Dr. A. C. Houston; "The Purification of Water by Ozone and Chlorine; and Domestic Filters," Prof. G. Sims Woodhead; "The Principles and Practice of the Dilution Method of Sewage Disposal," Dr. W. E. Adeney; "Disinfection," Dr. C. W. Ponder; "Housing in Relation to Public Health," Dr. C. J. Coleman; "School Hygiene," Dr. E. T. Roberts; "Soils, Subsoils, and Climate in Relation to Health," G. Walker; "Meat Inspection," Dr. W. J. Howarth and T. D. Young; "Vital Statistics," R. Dudfield and G. U. Yule; and "Foods, Sound and Unsound," Dr. H. C. Haslam.

OUR ASTRONOMICAL COLUMN.

COMET 1917*b* (SCHAUMASSE).—From observations of this comet made on April 28, April 29, and May 4, the following elements and ephemeris for Greenwich midnight have been calculated by J. Braae and J. Fischer-Petersen:—

$$T = 1917 \text{ May } 18{\cdot}2946 \text{ G.M.T.}$$

$$\left.\begin{array}{l}\omega = 119^\circ\ 11'{\cdot}90 \\ \Omega = \ \ 9^\circ\ 37'{\cdot}25 \\ i = 158^\circ\ 42'{\cdot}87\end{array}\right\}1917$$

$$\log q = 9{\cdot}88304$$

1917		R.A. h. m. s.	Decl. ° ′	Log *r*	Log Δ
May 31	...	8 25 32	+38 30·2		9·7109
June 1	...	8 35 14	36 2·7	9·9101	9·7375
2	...	8 43 12	33 50·2		9·7636
3	...	8 49 52	31 50·8		9·7889
4	...	8 55 29	30 3·4		9·8133
5	...	9 0 16	+28 26·7	9·9255	9·8369

FIREBALLS IN JUNE.—Mr. Denning writes:—The twilight prevailing during the nights of the month of June is not favourable for meteoric work, but fireballs are often numerous and easily seen. During the first week of June many large meteors have appeared from a radiant in Scorpio at about 252°–22°, and they have had unduly long flights and slow motions. There are other striking radiants in Ophiuchus and Antinous. This year a special effort will be made by observers near the end of the month, with the object of ascertaining whether there is any repetition of the rich shower which occurred on June 28, 1916, and was presumably connected with the periodical comet of Pons-Winnecke. On that date the rich cluster of meteors through which the earth passed must have been more than 600 millions of miles from the cometary nucleus, so that the meteors are distributed along a very considerable section of the orbit, if indeed they do not form a complete elliptical stream.